Supplementary Material for

Standardised Nomenclature, Abbreviations, and Units for the study of Bone Marrow Adiposity: Report of the Nomenclature Working Group of the International Bone Marrow Adiposity Society.

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Supplementary References: Includes 560 references for publications cited in the Supplementary Tables.

Term	Abbreviation	Year first used*	No. of papers using this term*	References
Bone marrow adiposity				
marrow adiposity	*none*	1967	119	[1-119]
bone marrow adiposity	*none*	2002	78	[5; 7; 9; 10; 12; 22; 26; 27; 33; 34; 36; 37; 39; 40; 48; 49; 52; 57; 60; 62; 67; 79; 80; 82; 83; 88; 92; 107; 111-113; 116; 120-165]
	BM adiposity	2011	12	[54; 104; 110; 166-174]
	BMA	2013	9	[114; 175-182]
	BMAT	2017	1	[183]
bone adiposity	*none*	2009	4	[7; 74; 112; 134]
adiposity	*none*	2017	2	[85; 104]
yellow bone marrow adiposity	yellow BMA	2013	1	[175]
proximal tibia adiposity	*none*	2018	1	[172]
yellow marrow				
yellow marrow	*none*	1883	108	[8; 34; 40; 43-45; 47; 49; 55; 58; 65; 73; 78; 82; 87; 89; 91; 101; 110; 117; 134; 137; 151; 158; 159; 164; 167; 168; 171; 174; 176; 178; 180; 181; 184-258]
	YM	2010	1	[259]
yellow marrow (inactive marrow)	*none*	2003	1	[260]
yellow bone marrow	*none*	1936	23	[40; 101; 118; 138; 160; 175; 187; 188; 220; 261-274]
	YBM	1967	2	[275; 276]
	yellow BM	1996	2	[277; 278]
	YM	2019	1	[256]
yellow bone marrow adiposity	yellow BMA	2013	1	[175]

yellow fatty marrow	*none*	1933	7	[116; 186; 195; 270; 279]
yellow fatty bone marrow	*none*	2017	1	[280]
yellow fat marrow	*none*	1979	1	[194]
adipocytic yellow marrow	*none*	2015	1	[43]
yellow adipocyte-rich marrow	*none*	2017	1	[73]
yellow adipose marrow	*none*	2018	1	[281]
aplastic (yellow) marrow	*none*	1974	1	[282]
Fatty marrow				
fatty marrow	*none*	1922	82	[5; 32; 48; 51; 52; 56; 69; 78; 84; 86; 94; 97; 117; 123; 132; 164; 170; 176; 186; 187; 189; 190; 196; 200; 202; 203; 205; 206; 208; 210-216; 219; 221; 222; 238; 245; 246; 250; 251; 253; 259; 262; 266; 271; 277; 280; 282-312]
fatty bone marrow	*none*	1990	7	[264; 265; 280; 313-316]
	fatty BM	2008	1	[317]
fat marrow	*none*	1985	1	[201]
fat bone marrow	FBM	2014	1	[267]
fatty yellow marrow	*none*	2013	7	[29; 114; 138; 142; 223; 280; 318]
fatty portion of the marrow	*none*	1949	1	[319]
aplastic (fatty) marrow	*none*	1974	1	[282]
Red marrow				
red marrow	*none*	1883	122	[6-8; 29; 34; 43-45; 47; 49; 55; 58; 65; 73; 77; 78; 82; 87; 89; 98; 101; 110; 114; 117; 123; 134; 137; 138; 140; 142; 151; 158; 159; 164; 167; 168; 171; 173; 174; 176; 178; 180; 184-187; 189-193; 195; 196; 204; 206-221; 223-229; 231-242; 245-253; 255-258; 268; 280; 282-284; 287; 289; 290; 292; 302; 310; 311; 320-327]
	RM	2010	2	[259; 318]

red marrow (active marrow)	*none*	2003	1	[260]
red bone marrow	*none*	1922	21	[40; 84; 101; 118; 138; 160; 173; 175; 187; 243; 263; 266; 271; 273; 274; 278; 283; 328-331]
	red BM	1996	2	[272; 277]
	RM	2019	1	[256]
	RBM	2015	2	[276; 332]
red distal bone marrow	*none*	1979	1	[194]
red femoral marrow	*none*	1933	2	[194; 285]
h(a)em(at)opoietic marrow	*none*	1936	24	[5; 7; 91; 97; 117; 134; 167; 176; 187; 190; 191; 218; 221; 245; 251; 253; 271; 282; 291; 292; 309; 333-335]
red h(a)em(at)opoietic marrow	*none*	2017	5	[114; 116; 254; 270; 280]
h(a)em(at)opoietic red marrow	*none*	1979	4	[110; 123; 194; 250]
h(a)em(at)opoietic bone marrow	*none*	1979	3	[9; 266; 336]
	HBM	2014	1	[267]
red h(a)em(at)opoietic bone marrow	*none*	2017	2	[73; 281]
erythropoietic marrow	*none*	2018	1	[246]
nonfatty marrow	*none*	1995	1	[211]

Supplementary Table 1 (related to Table 2): Full list of all terms and abbreviations that have been used to refer to bone marrow adiposity, yellow marrow, fatty marrow or red marrow. Relevant terms and abbreviations were identified through a systematic search of the literature on bone marrow adiposity (BMA). Based on this search, citations for papers using each term/abbreviation combination are shown in the right-hand column, with the total number of papers and the year of first use shown in the preceding columns; asterisks are shown to emphasise that other uses may exist. In some cases, no abbreviation is used (*none*). Recommended terms and abbreviations are presented in Table 2.

Term	Abbreviation	Year first used*	No. of papers using this term*	References
Bone marrow adipocyte				
bone marrow adipocyte	*none*	1976	100	[7; 13; 14; 17; 23; 26; 29; 30; 33; 43; 45; 49; 56; 57; 67; 71; 72; 76; 77; 84; 92; 100; 103; 105; 108; 111; 112; 114; 115; 123-126; 128; 130; 135; 136; 139; 142; 148; 155; 156; 162-165; 177; 179; 204; 228; 236; 237; 242; 244; 271; 272; 307; 316; 331; 337-377]
	BM adipocyte	1995	30	[54; 63; 78; 93; 110; 153; 167; 169-172; 176; 181; 239; 278; 306; 317; 318; 322; 323; 378-387]
	BMA	2016	17	[65; 74; 104; 107; 157; 168; 174; 249; 268; 273; 324; 327; 388-392]
	BMAd	2019	2	[182; 257]
	MAT adipocyte	2015	6	[68; 234; 238; 247; 280; 325]
	BMAT adipocyte	2018	3	[91; 97; 388]
	BM-A	2013	2	[266; 326]
	BM-AD	2018	2	[173; 393]
	marrow AC	2016	1	[147]
marrow adipocyte	*none*	1978	105	[3; 6-8; 17-19; 26; 29-32; 39; 41; 42; 47; 54; 58; 61; 62; 66; 73; 77; 82; 84; 86-88; 94-96; 100; 101; 106; 108; 110; 111; 113; 116; 119; 123; 124; 126; 128; 139; 142; 143; 151; 152; 154; 159; 162; 178; 180; 194; 217; 218; 231; 234; 238; 242; 248; 253; 254; 260; 280; 281; 308; 321; 323; 331; 335; 342; 345; 347; 349; 352; 358; 361; 362; 365; 369; 375; 392; 394-414]
adipocyte	*none*	1981	39	[52; 55; 57; 69; 70; 72; 83; 85; 88; 90; 99; 109; 117; 118; 154; 158; 183; 205; 221; 222; 240; 252; 260; 269; 274; 279; 309; 312; 334; 415-424]
	AC	2018	1	[251]
adipose cell	*none*	1971	16	[191-193; 196; 198-200; 221; 277; 278; 282; 291; 415; 425-427]
	Adip	2005	1	[314]
marrow adipose cell	*none*	1971	8	[33; 191; 291; 292; 337; 425; 428; 429]

bone adipocyte	*none*	1981	6	[26; 366; 430-433]
bone marrow adipose cell	*none*	1974	3	[292; 337; 425]
marrow-associated adipose cell	*none*	1974	1	[425]
medullary adipocyte	*none*	2010	1	[357]
skeletal adipocyte	*none*	2015	1	[234]
yellow adipocyte	*none*	2019	1	[173]
Bone marrow fat cell				
fat cell	*none*	1893	48	[82; 118; 140; 163; 185; 187; 189; 191; 192; 195; 197; 214; 259; 265; 285; 290-292; 298; 317; 330; 336; 337; 348; 416; 418; 434-455]
	FC	1935	1	[287]
fatty cell	*none*	1985	3	[295; 314; 456]
marrow fat cell	*none*	1931	14	[58; 96; 192-195; 294; 298; 329; 402; 425; 434; 457; 458]
bone marrow fat cell	*none*	1966	10	[29; 162; 337; 359; 399; 459-463]
	BM fat cell	1998	1	[379]
fat-containing cell	*none*	1980	2	[330; 464]
	FCC	1983	1	[465]
fat-storage cell	*none*	1986	2	[296; 297]
Other terms				
fat spaces	*none*	1934	1	[328]
giant fat cell	*none*	1981	1	[466]
unilocular fat cell	*none*	1999	1	[460]
mature adipocyte	*none*	2004	2	[315; 467]
fat-accumulating cell	*none*	2007	1	[265]
fibroblast-like fat cell	FLFC	2008	1	[317]
marrow-resident adipocyte	*none*	2017	1	[73]
yellow fat cell	*none*	2017	1	[87]

Supplementary Table 2 (related to Table 3): Full list of all terms and abbreviations that have been used to refer to bone marrow adipocytes. Data were obtained and are presented as described for Supplementary Table 1. Recommended terms and abbreviations are presented in Table 3.

Term	Abbreviation	Year first used*	No. of papers using this term*	References
Bone marrow adipose tissue				
adipose tissue	*none*	1883	17	[112; 146; 184; 193; 194; 198; 199; 207; 252; 261; 291; 307; 333; 334; 345; 439; 468]
adipose tissue from bone	*none*	1999	1	[460]
adipose marrow	*none*	1991	4	[88; 218; 326; 468]
adipose marrow tissue	*none*	2017	1	[88]
marrow adipose	*none*	1971	2	[87; 291]
marrow adipose tissue	*none*	1971	31	[31; 38; 59; 75; 87; 94; 95; 118; 119; 129; 149; 150; 162; 177; 193; 195; 196; 236; 256; 291; 292; 298; 342; 344; 368; 396; 408; 410; 422; 425; 469]
	MAT	2012	56	[21; 44; 47; 53; 58; 62; 66-68; 71; 76; 78; 82; 83; 85; 89; 90; 101; 102; 106; 108; 116; 117; 145; 148; 152; 159; 168; 183; 234; 238; 242; 248; 250; 253; 254; 269; 271; 272; 278; 280; 281; 306; 323; 325; 400; 403-406; 470-475]
marrow-associated adipose	*none*	1974	1	[425]
bone marrow adipose tissue	*none*	1974	34	[8; 46; 65; 85; 100; 109; 163; 177; 191; 194; 230; 236; 251; 254; 273; 274; 301; 338; 365; 368; 389; 399; 422; 424; 429-432; 476-481]
	BMAT	2007	49	[40; 73; 75; 77; 82; 91; 93; 97; 103-105; 107; 111; 150; 153; 155; 164; 168; 170-172; 174; 176; 178; 179; 182; 220; 224; 247; 249; 256-258; 268; 272; 305; 315; 322; 327; 331; 388; 391; 393; 410; 482-486]
	BM adipose tissue	1988	6	[181; 235; 239; 298; 387; 392]
	MAT	2014	15	[80; 110; 165; 167; 169; 247; 318; 370; 377; 385; 386; 400; 411; 412; 487]
	BM-AT	2019	1	[173]

bone marrow adipose	*none*	1979	5	[182; 274; 353; 375; 426]
Yellow adipose tissue				
yellow adipose tissue	*none*	1883	2	[184; 228]
	YAT	2011	4	[135; 272; 321; 398]
yellow adipose	*none*	2016	1	[322]
yellow fat	*none*	1933	2	[186; 331]
yellow adipose marrow	*none*	2018	1	[281]
fatty tissue	*none*	1922	1	[283]
fatty yellow adipose tissue	*none*	2019	1	[164]
bone marrow fatty tissue	*none*	1993	1	[341]
Marrow fat				
marrow fat	*none*	1954	101	[7-14; 17; 19; 21; 23; 24; 29; 30; 34; 38; 41; 44; 49; 54-56; 61; 66; 69; 70; 82; 84; 86; 96; 99; 114; 115; 118; 119; 125; 131; 133; 143; 145; 147; 149; 151; 193; 194; 205; 220; 222; 240; 248; 255; 259; 275; 300-303; 306; 312; 313; 321; 323; 324; 355; 395; 398; 401; 420; 425; 441; 456; 457; 468; 473; 480; 488-512]
	MF	2008	3	[4; 43; 45]
bone marrow fat	*none*	1936	80	[9; 13; 17; 27; 28; 30; 40; 46; 57; 73; 80; 87; 88; 125; 130; 135; 137; 138; 141; 144; 145; 149; 152; 160; 181; 183; 187; 188; 220; 229; 232; 233; 237; 240; 241; 243; 245; 255; 259; 276; 279; 302; 326; 332; 337; 343; 350; 354; 355; 360; 365; 376; 390; 398; 399; 414; 419; 422; 478; 480; 482; 485; 487; 504; 506; 509-511; 513-524]
	BM fat	2002	3	[78; 221; 382]
	BMF	2007	11	[55; 98; 114; 142; 158; 228; 251; 273; 320; 367; 371]
	MF	2014	1	[421]
medullary fat	*none*	1994	2	[512; 525]
bone fat	*none*	2010	1	[259]

Supplementary Table 3 (related to Table 4): Full list of all terms and abbreviations that have been used to refer to bone marrow adipose tissue, yellow adipose tissue or marrow fat. Data were obtained and are presented as described for Supplementary Table 1. Recommended terms and abbreviations are presented in Table 4.

Term used	Abbreviation	Year first used*	No. of papers using this term*	References
Constitutive or Regulated BMAT and BMAds				
constitutive marrow adipose tissue	cMAT	2014	26	[58; 67; 78; 97; 101; 102; 108; 110; 159; 165; 167; 168; 234; 238; 253; 254; 272; 273; 280; 318; 322; 325; 370; 405; 470; 510]
	constitutive	2017	1	[271]
constitutive bone marrow adipose tissue	cBMAT	2017	7	[73; 107; 164; 170; 171; 174; 249]
	constitutive	2017	2	[178; 391]
constitutive bone marrow adipocyte	cMAT adipocyte	2015	6	[68; 110; 234; 238; 280; 325]
	cBMA	2016	7	[157; 168; 249; 268; 324; 327; 389]
regulated marrow adipose tissue	rMAT	2014	26	[58; 67; 78; 97; 101; 102; 108; 110; 159; 165; 167; 168; 234; 238; 253; 254; 272; 273; 280; 318; 322; 325; 370; 405; 470; 510]
	regulated MAT	2017	1	[271]
regulated bone marrow adipose tissue	rBMAT	2017	7	[73; 107; 164; 170; 171; 174; 249]
	regulated BMAT	2017	2	[178; 391]
regulated bone marrow adipocyte	rMAT adipocyte	2015	6	[68; 110; 234; 238; 280; 325]
	rBMA	2016	8	[107; 157; 168; 249; 268; 324; 327; 389]
	none	2017	1	[73]
Distal or Proximal BMAT and BMAds				
distal marrow adipose tissue	distal MAT	2016	1	[318]
distal marrow fat	*none*	1979	1	[194]
distal tibia marrow adipose tissue	dMAT	2017	1	[242]
proximal marrow adipose tissue	proximal MAT	2016	1	[318]
proximal marrow fat	*none*	1979	1	[194]
proximal tibia marrow adipose tissue	pMAT	2017	1	[242]

Bone-specific terms				
femoral adipose cell	*none*	1977	1	[192]
femur marrow fat	FMF	1984	1	[526]
tibial adipose bone marrow	*none*	1985	1	[338]
vertebrae adipose cell	*none*	1977	1	[192]
vertebral fat	*none*	1989	1	[527]
intravertebral bone marrow fat	*none*	2002	1	[528]
vertebral bone marrow fat	*none*	2012	1	[529]
	VMB fat	2017	1	[79]
vertebral BMAT	vBMAT	2018	1	[179]
vertebral marrow fat	*none*	2012	1	[222]
vertebral MAT	vMAT	2018	1	[278]
BMAT within red or yellow marrow				
red marrow fat	*none*	1940	2	[188; 513]
red bone marrow fat	*none*	2001	2	[330; 332]
	RBM fat	2019	1	[276]
red marrow adipose tissue	rMAT	2018	2	[97; 410]
yellow marrow adipose tissue	yMAT	2018	2	[97; 410]
Other terms				
structured fat	*none*	1984	1	[188; 450; 513]

Supplementary Table 4 (related to Table 5): Full list of all terms and abbreviations that have been used to refer to subtypes or site-specific differences in BMAT and BMAds. Data were obtained and are presented as described for Supplementary Table 1. The term "structured fat" was used to refer to the constitutive-like BMAds that exist in contiguous groups, so is included here for this reason. Recommended terms and abbreviations are presented in Table 5.

Abbreviation	Term used	Year first used*	No. of papers using this term*	References
SSC	skeletal stem cell	2004	12	[72; 102; 103; 165; 178; 218; 231; 244; 325; 530-532]
	skeletal stem cell *(no abbreviation)*	2004	11	[161; 180; 181; 258; 393; 402; 413; 533-535]
	mouse skeletal stem cell (mSSC)	2015	1	[530]
	human skeletal stem cell (hSSC)	2018	1	[532]
BMSC	bone marrow stromal cell	2004	20	[23; 26; 36; 59; 64; 111; 133; 139; 161; 169; 178; 231; 280; 303; 315; 404; 484; 531; 534; 536]
	bone marrow mesenchymal stem cell	2013	5	[37; 165; 273; 365; 409]
	bone marrow mesenchymal stem cell	2012	1	[132]
	bone marrow stromal cell (mBMSC)**	2015	1	[49]
	bone mesenchymal stem cell	2016	1	[238]
	bone-derived marrow mesenchymal stem cell	2017	1	[154]
	bone marrow stromal cell (BM stromal cell)	2017	1	[168]
	bone marrow mesenchymal cell	2018	1	[389]
	bone marrow mesenchymal stromal cell	2018	1	[325]
	not defined	2018	1	[102]
	bone marrow mesenchymal stem/stromal cell	2019	1	[115]
BM stromal cell	bone marrow stromal cell	1995	3	[176; 378; 379]
BM mesenchymal stromal cell	bone marrow mesenchymal stromal cell	2018	1	[171]
MMC	multipotent mesenchymal cell	2012	1	[22]

MSC	mesenchymal stem cell	2003	59	[6; 8; 10; 16; 34; 37; 41; 42; 53; 56; 61; 62; 65; 66; 73; 78; 83; 85; 87; 92; 101; 108; 128; 139; 142; 152; 155; 156; 161; 164; 177; 228; 231; 239; 248; 254; 259; 265; 268; 270; 274; 281; 309; 316; 348; 357; 376; 377; 392; 402; 420; 433; 471; 473; 519; 531; 535-537]
	mesenchymal stromal cell	2012	10	[24; 88; 159; 174; 269; 322; 325; 372; 388; 393]
	abbreviation not defined	2015	5	[88; 242; 406; 472; 510]
	human mesenchymal stem cell (hMSC)	2004	4	[52; 154; 388; 533]
	bone marrow mesenchymal stromal cell	2014	4	[84; 93; 135; 167]
	mesenchymal stem/stromal cell	2016	4	[112; 151; 178; 272]
	marrow stromal cell	2003	3	[77; 348; 537]
	bone marrow mesenchymal stem cell	2015	3	[100; 110; 233]
	bone marrow stromal cell	2004	2	[347; 504]
	Human bone marrow stromal cell (hMSC)	2004	1	[417]
	bone marrow mesenchymal stem cell	2012	1	[132]
	mesenchymal progenitor	2016	1	[147]
	bone marrow-derived mesenchymal stem cell	2018	1	[90]
	bone mesenchymal stem cell	2018	1	[95]
BM-MSC	bone marrow mesenchymal stem cell	2013	5	[157; 172; 266; 387; 412]
	bone marrow mesenchymal stromal cell	2018	2	[326; 393]
	bone marrow MSC	2017	1	[239]
	bone marrow skeletal stem cell	2018	1	[172]
	bone marrow stromal stem cell	2019	1	[258]
No abbreviation used	mesenchymal stem cell	2004	38	[5; 31; 67; 77; 79-81; 94; 97; 100; 105; 106; 116; 117; 123; 126; 127; 156; 158; 159; 176; 218; 253; 258; 331; 354; 359; 361; 362; 411; 414; 423; 487; 505; 522; 524; 530; 532]
	bone marrow stromal cell	1990	18	[58; 88; 90; 124; 125; 128; 134; 163; 204; 304; 342; 364; 390; 410; 532; 533; 538]

	mesenchymal progenitor	2013	9	[77; 107; 115; 170; 182; 226; 248; 407; 413]
	marrow stromal cell	2003	4	[252; 418; 533; 535]
	bone marrow mesenchymal stromal cell	2010	4	[72; 85; 98; 125]
	mesenchymal progenitor cell	2017	4	[82; 119; 169; 249]
	bone marrow mesenchymal stem cell	2016	3	[69; 173; 374]
	mesenchymal stromal cell	2016	3	[72; 103; 486]
	mesenchymal cell	1970	2	[290; 291]
	bone mesenchymal stem cell	2017	2	[119; 480]
	bone marrow mesenchymal cell	2016	1	[69]
	bone marrow stem cell	2017	1	[75]
	mesenchymal precursor	2017	1	[74]

Supplementary Table 5 (related to Table 6): Full list of all terms and abbreviations that have been used to refer to progenitors for BMAds. Data were obtained and are presented as described for Supplementary Table 1. In many cases, the same abbreviation has been applied to several different terms. Conversely, in many cases terms have been used without ascribing an abbreviation, as indicated in the final section of this table. In some cases, the species of the cells is also indicated (** e.g. mBMSC for "mouse BMSC"). Recommended terms and abbreviations are presented in Table 6.

Measurement type	Described as	Abbreviations used	Units used	Year first used*	No.	References	Recommended term(s) and unit(s)
adipocyte area (per cell)	adipocyte size	*none*; Ad.Ar	µm^2, mm^2	2002	15	[15; 30; 36; 59; 60; 62; 80; 93; 111; 125; 130; 148; 350; 382; 393]	**Report as 'Adipocyte area' (Ad.Ar, µm^2).** *Showing the frequency distribution of Ad.Ar is recommended*
	adipocyte area	*none;* Ad.Ar	µm^2, mm^2, pixels	2012	10	[19; 172; 234; 318; 327; 368; 405; 406; 409; 412]	
	adipocyte size (cross-sectional area)	*none*	µm^2, area x 10^{-4} mm	2007	2	[239; 352]	
	femoral adipocyte vacuole area	*none*	µm^2	2011	1	[166]	
	adipocyte cross section area	*none*	mm^2	2017	1	[87]	
adipocyte area (total)	total adipocyte area	Ad.Ar	mm^2	2015	1	[45]	**Don't use** *(instead report as % Ma.Ar or % T.Ar)*
adipocyte diameter (per cell)	adipocyte diameter; mean adipocyte diameter; adipocyte mean diameter; fat cell diameter	none; MAD; Ad.Dm; Ad.MD	*n.s.*, µm	1989	16	[14; 31; 32; 41; 61; 94; 143; 155; 329; 346; 374; 377; 401; 418; 429; 507]	**Report as 'Adipocyte diameter' (Ad.Dm, µm)****
	adipocyte size; fat cell size; bone marrow fat cell size	none; Ad.Dm; Ad.Size	µm	1993	9	[25; 86; 96; 103; 308; 341; 461; 463; 477]	
adipocyte perimeter (per cell)	adipocyte perimeter	*none;* Ad.Pm	µm, mm	2002	4	[19; 349; 360; 382]	**'Adipocyte perimeter' (Ad.Pm, µm)****
	adipocyte circumference	Ad.C	mm^{-2}	2019	1	[104]	
adipocyte perimeter (total)	total adipocyte perimeter	Ad.Pm	mm	2015	1	[45]	**Don't use**

adipocyte density (cells per marrow area)	adipocyte density; bone marrow adipocyte density	Ad.D; Ad.Dn, Ma.V; %ATV	no/mm^2, cells/mm^2 marrow area, cells/mm^2 marrow volume, % adipose tissue volume	1990	6	[19; 31; 45; 163; 205; 377]	**Report as 'Adipocyte density' or 'Adipocyte number' relative to marrow area (N.Ad/Ma.Ar) or volume (N.Ad/Ma.V); or tissue area (N.Ad/T.Ar) or volume (N.Ad/TV).** Units should be clearly stated (e.g. cells/mm^2, cells/µm^2, etc...)
	adipocyte number; adipocyte no.	N.A/MV; BM	cells per marrow area, no./mm^2 bone marrow, % adipocytes in BM	2000	4	[239; 344; 382; 396]	
	adipocyte counts	*none;* N.At/M.Ar	cells/mm^2, cells/0.1.mm^2	2005	3	[63; 226; 349]	
	bone marrow adipocytes	*none*	cells/mm^2 marrow area	2012	1	[23]	
	number of fat cells per unit area	Na.Fa/Ma.V	cells/mm^2	2005	1	[351]	
adipocyte density (cells per tissue area)	adipocyte density; marrow adipocyte density	*none;* Ad.D; AV/TV; N.Ad.T.Ar	#/mm^2, #/µm^2, 1/mm^2, no./mm^2, cells/mm^2, %	1991	22	[18; 20; 30; 32; 41; 59-62; 80; 94; 112; 130; 143; 156; 308; 350; 352; 360; 397; 401; 468]	
	adipocyte number; bone marrow adipocyte number; number of adipocytes	*none*; Ad.N; AD#; N.Ad/T.Ar	/mm^2, #/mm^2, 1/mm^2, no./mm^2, mm-2, number/mm^2	2008	21	[14; 19; 37; 48; 64; 86; 87; 96; 104; 111; 125; 126; 148; 154; 353; 360; 374; 406; 409; 412; 539]	
	adipocyte number per mm^2; adipocytes/mm^2; adipocytes/µm^2; adipocyte number/cm2	*none*; Ad.N	adipocyte number per mm^2, adipocytes/mm^2, 1/mm^2, #/µm^2, adipocyte number/cm2, adipocytes/µm^2	2003	6	[42; 45; 54; 72; 102; 418]	
	adipocytes per total area; adipocytes/area; adipocyte number/tissue area	*none*; N.Ad/T.Ar	/mm^2, no.mm^2, #/µm^2	2010	3	[10; 113; 156]	
	adipocyte count	*none*	adipocytes/mm^2	2018	1	[92]	

adipocyte density (cells per marrow or tissue volume)	adipocyte number/marrow volume; cell number per μm^3	*none;* Ad.N/MV	adipocyte number/marrow volume, cells/mm^3, cells/μm^3	1989	5	[25; 51; 69; 244; 429]	**Report N.Ad/Ma.V or N.Ad/TV** (as described above)
	number of adipocytes per microliter	Nv	adipocytes/µL	2002	1	[346]	
	adipocyte density	Ad.Dn	cells/mm^3	2019	1	[103]	
adipocyte density (cells per field)	adipocyte number	*none*; AD/HPF	cells/field, cells/section, cells/10 serial sections, % cells field of view	2004	11	[6; 15; 33; 93; 155; 239; 244; 355; 364; 398; 467]	**Don't use**
	adipocyte density	AD/field	cells per field	2018	1	[393]	
adipocyte number	adipocyte number; adipocyte #; fat cell number; No. adipocytes	*none;* N.Ad	number	1993	10	[17; 127; 165; 234; 329; 341; 347; 352; 507; 540]	**Don't use** (instead report adipocyte density, as above)
adipose area (per marrow area)	adipose tissue fraction; fat fraction; bone marrow fat fraction; marrow fat tissue fraction	*none;* FF	%, fraction *(not %)*	1989	4	[36; 346; 429; 477]	**Report as adipose area (Ad.Ar) relative to marrow area (Ma.Ar) or tissue area (T.Ar). This should be presented as % and referred to as 'Adipose area' or 'Adipose tissue area'.** *Don't report absolute adipose area without using a referent area*
	percent adipocyte area; marrow adipose tissue %	*none;* BM	%, % per BM area, % (adipocytes/marrow)	2012	4	[41; 59; 61; 399]	
	adipocyte coverage	BM	% of total BM	2018	1	[393]	
	marrow fat proportion	*none*	% of marrow area	2019	1	[111]	
	metaphyseal adipose area	*none*	% of medullar area	2012	1	[22]	
adipose area (per tissue area)	adiposity; marrow adiposity	*none;* Ad.Ar/T.Ar	%	2013	5	[30; 60; 62; 80; 104]	
	adipocyte area; area of fat infiltration; AV/TV	none; AV/TV	%, % tissue area	2001	4	[33; 148; 334; 353]	
	adipocyte area/tissue area	*none;* Ad.Ar/T.Ar	%, fraction *(not %)*	2010	4	[102; 125; 130; 156]	
	fat fraction; vertebral fat	Ad.A/T.A	%	2009	2	[122; 507]	
adipose area (per haematopoietic tissue area)	adipocytic tissue/hematopoietic tissue	A/H ratio	*n.s.,* %	2002	2	[507; 541]	

adipose volume (per haematopoietic marrow volume)	marrow adiposity	AdV/HmMaV	%	1998	1	[3]	**Report as adipose volume (Ad.V) relative to marrow volume (MA.V) or tissue volume (TV). This should be presented as % and referred to as 'Adipose volume' or 'Adipose tissue volume'.** *Don't report absolute adipose volume without using a referent volume*
adipose volume (per marrow volume)	adipocyte volume; adipocyte volume/marrow volume; marrow adipose tissue volume	*none;* AV/MV; Ad.V.Ma.V; Ad.V/MV	*n.s.*, %	2000	13	[19; 25; 31; 32; 45; 51; 69; 156; 344; 374; 377; 396; 539]	
	fat marrow volume; bone fat volume as % marrow volume	FV/MV; Fa.V/Ma.V	%	2004	2	[351; 467]	
	BMAT fraction; BMAT volume fraction	AdV/MarV; AD.V/Ma.V	%	2019	2	[103; 485]	
adipose volume (per tissue volume)	adipocyte volume/tissue volume; adipose volume/tissue volume; adipose volume/TV	Ad/TV; AV/TV	*n.s.*, %, fraction (*not %*)	1998	8	[3; 14; 43; 50; 106; 116; 347; 401]	
	adipocyte volume; total adipose tissue volume	AV/TV; Ad.V/TV	%	1991	2	[377; 468]	
	adipocyte volume fraction; BMAT volume fraction	AV/TV; Ad.V/TV	%	2016	2	[64; 103]	
	adipose tissue volume per total volume	AV/TV	%	2001	1	[479]	
	marrow adiposity	FV/BV	*%*	2011	1	[13]	
adipose volume (absolute)	marrow adipose volume	MAV	*n.s.*	1983	1	[542]	**Don't use** *(instead report as % Ma.V or % TV)*
adipocyte volume (absolute)	adipocyte volume	*none*	*n.s.*	1993	1	[477]	**Don't use**

adipose tissue area (absolute)	marrow adipose tissue area	*none*	mm^2	2017	1	[87]	**Don't use** (instead report as % Ma.Ar, % Hm.Ar o`r % T.Ar)
adipose area (per field or section area)	marrow adiposity; proximal tibia adiposity; bone marrow fat; fat content	*none*	%	1950	4	[15; 172; 543; 544]	
	adipocyte area	Adipo/SA	% (adipocyte area/section area)	2009	1	[504]	
adipose area (denominator unclear)	marrow fat; per adipocyte area; percentage of adipocyte area	*none*	pixels, %	2002	8	[24; 86; 94; 96; 308; 350; 382; 409]	
adipocyte surface (per trabecular surface)	Fat tissue fraction	*none*	%	2003	1	[260]	**Don't use**
Other measurements	unit adipocyte volume	AV/N.A	mcm2	2000	2	[344; 396]	
	adipocyte size/marrow volume	Ad.size/MV	µm	2015	2	[51; 69]	
	Index of proportionality	N/S	adipocyte number/size	1993	1	[477]	
	Unit fat volume	Fa.V/N.Fa	µm^2	2005	1	[351]	

Supplementary Table 6 (related to Table 7): Full list of all terms, abbreviations and units that have been used to refer to histomorphometric measurements related to BMA. Data were obtained and are presented as described for Supplementary Table 1, except that recommendations are also shown here given the greater amount of terms, abbreviations and units that have been used for histological measurements. In many cases, the same abbreviation has been applied to several different terms, whereas sometimes measurements are described without an abbreviation (*none*) and/or units are not stated (*n.s.*). Owing to space limitations, several terms are shown in this table but not in Table 7; it is recommended that these terms no longer be used to report histology-based measurements relating to BMA. **For readouts of adipocyte perimeter (Ad.Pm) and diameter (Ad.Dm), we recommend showing the frequency distribution for each BMAd, rather than the mean or median of all BMAds.

Term	Abbreviation	Units	Year first used*	No. of papers using this term*	References
Fat fraction					
fat fraction	FF	*n.s.*	2004	1	[514]
	FF	%	2015	9	[95; 143; 150; 235; 252; 274; 414; 511; 524]
	FF	lipid/water ratio	2017	2	[311; 480]
	none	%	2001	14	[45; 70; 75; 86; 94; 140; 141; 229; 251; 330; 332; 411; 509; 523]
	none	*n.s.*	1999	1	[301]
marrow fat fraction	FF	%	2015	5	[56; 86; 96; 308; 408]
	FF	lipid/water ratio	2015	1	[545]
	FF	*n.s.*	2013	2	[32; 84]
	MFF	%	2014	3	[41; 70; 401]
	none	*n.s.*	1992	14	[43; 44; 88; 95; 99; 119; 132; 223; 227; 249;
	none	%	2010	2	[94; 259]
bone marrow fat fraction	BM fat fraction	%	*2001*	*5*	*[137; 141; 225; 259; 547]*
	BMF	%	2004	1	[514]
	BMFF	%	2015	2	[46; 180]
	BMFF	*n.s.*	2016	3	[168; 182; 237]
	BMFF	%	2015	1	[232]
	FF	*n.s.*	2002	1	[346]
	none	*n.s.*	1995	8	[140; 216; 227; 245; 271; 329; 481; 524]
	BM fat fraction	*n.s.*	2018	1	[171]
	none	lipid/water ratio	2015	1	[422]
proton density fat fraction	PDFF	%	2014	15	[97; 119; 137; 138; 141; 158; 160; 227; 232;
	PDFF	*n.s.*	2016	2	[237; 256]
	proton density FF	%	2017	1	[84]
	none	*n.s.*	2015	2	[46; 144]

signal fat fraction	sFF	%	2013	2	[223; 385]
	sFF	n.s.	2015	1	[43]
	none	*n.s.*	2012	1	[222]
fat signal fraction	FF	%	2017	1	[310]
	none	%	2012	1	[335]
	none	n.s.	2015	1	[422]
lipid fraction	*none*	*lipid/water ratio*	1985	1	[202]
	none	*%*	2000	2	[183; 550]
bone marrow lipid fraction	LF	%	2012	1	[419]
red marrow fat fraction	*none*	*n.s.*	2015	1	[45]
marrow lipid fraction	*none*	%	2013	1	[31]
marrow fat volume fraction	*none*	%	2015	1	[53]
MAT fraction	MAT fraction	lipid/water ratio	2015	2	[44; 474]
bone marrow proton density fat	PDFF	%	2017	1	[271]
fractional proton density of fat	*none*	n.s.	1985	1	[202]
proportion of protons in the fat	*none*	*%*	2001	1	[330]
vertebral fat fraction	VFF	%	2012	2	[222; 250]
	none	%	2009	1	[9]
vertebral marrow fat fraction	VFF	%	2018	1	[281]
yellow marrow fat fraction	*none*	*n.s.*	2015	1	[45]
Fat content					
fat content	FC	%	2012	3	[255; 267; 529]
	none	%	1987	4	[203; 309; 481; 502]
	none	*n.s.*	1990	8	[179; 211; 219; 299; 310; 375; 511; 550]
bone marrow fat content	BM fat content	*n.s.*	2018	1	[171]
	BMF content	%	2015	3	[98; 309; 367]
	bone marrow FC	%	2016	1	[146]
	FC	%	2012	1	[551]
	none	%	2011	3	[335; 506; 521]
	none	lipid/water ratio	2009	2	[12; 354]
marrow fat content	*none*	%	2005	7	[401; 501; 502; 505; 506; 546; 552]
	none	L	2007	1	[482]
	none	% fat fraction	2015	1	[509]
vertebral bone marrow fat content	VBM fat content	%	2017	1	[79]

fractional fat content	*none*	*n.s.*	1985	1	[202]
	none	%	2017	1	[241]
marrow adipose tissue content	MAT content	%	2016	1	[403]
	MAT content	lipid/water ratio	2018	1	[253]
bone marrow adipose tissue	BMAT content	*n.s.*	2018	1	[171]
Marrow fat					
bone marrow fat	BM fat	%	2017	1	[423]
	BMF	%	2014	2	[230; 407]
	l/w	lipid/water ratio	2014	1	[553]
	none	%	2011	6	[16; 35; 81; 99; 309; 520]
bone marrow fat composition	*none*	*n.s.*	2019	1	[276]
bone marrow fat concentration	*none*	%	2017	1	[243]
fat marrow	*none*	%	2006	1	[219]
intravertebral bone marrow fat	*none*	%	2002	1	[528]
marrow fat	*none*	%	2009	4	[81; 131; 421; 554]
	none	*n.s.*	1984	2	[294; 555]
marrow fat composition	*none*	*n.s.*	2014	1	[508]
marrow fat quantity	*none*	%	2015	1	[45]
vertebral marrow fat	*none*	%	2013	1	[35]
Bone marrow adipose tissue					
bone marrow adipose tissue	BMAT	L	2012	6	[225; 304; 305; 366; 420; 433]
bone marrow adipose tissue volume	BMAT volume	cm^3	2011	2	[220; 483]
marrow adipose tissue	MAT	%	2018	1	[411]
	MAT	lipid/water ratio	2014	3	[71; 385; 556]
red marrow adipose tissue	rMAT	%	2018	1	[410]
yellow marrow adipose tissue	yMAT	%	2018	1	[410]
Ratio (fat/water or lipid/water)					
bone marrow fat/water %	*none*	%	2011	1	[516]
bone marrow fat/water ratio	*none*	%	2014	1	[279]
fat/water ratio	*none*	*none*	2014	1	[279]
lipid/water ratio	l/w	*none*	2014	1	[508]
	LWR	*none*	2004	3	[16; 21; 514]
	none	%	2011	2	[516; 553]

	none	*none*	2013	7	[28; 71; 149; 306; 414; 474; 475]
Area					
bone marrow adipose tissue area	BMA	cm^2	2015	1	[233]
bone marrow adiposity cross-	CSA	cm^2	2017	1	[270]
yellow bone marrow cross-sectional	CSA	mm^2	2013	1	[175]
Other terms					
bone marrow adiposity	*none*	%	2012	1	[27]
fat component	*none*	n.s.	1999	1	[301]
fat concentration	*none*	n.s.	2000	1	[550]
fat proportion	*none*	%	2001	1	[547]
fat signal	*none*	n.s.	1993	1	[557]
fat signal intensity	*none*	n.s.	1995	2	[212; 330]
index of marrow conversion	IMC	n.s.	2006	1	[219]
percent marrow fat	%MF	%	2011	1	[131]
percentage of fat marrow	*none*	%	1999	1	[215]
proportion of fat	*none*	%	2001	1	[330]
spine fat	*none*	%	2011	1	[16]

Supplementary Table 7 (related to Table 8): Full list of all combinations of terms, abbreviations and units that have been used to report MRI/MRS-based measurements of bone marrow adiposity. Data were obtained and are presented as described for Supplementary Table 1. In some cases, no abbreviation is used (*none*) and/or units are not stated (*n.s.*). Recommended terms and abbreviations are presented in Table 8. Several terms are shown in this table but, because of space limitations, these have not been shown in Table 8; it is recommended that these terms no longer be used to report MRI/MRS-based measurements relating to BMA.

Imaging method	Measurement type	Described as	Abbreviations used	Units used	Year first used*	No. of papers*	References
SECT, DECT or µCT *(without contrast agent)*	**Fat fraction** (% or fraction)	fat content; bone marrow fat content	*none*	%	1987	3	[498; 527; 558]
		yellow marrow fraction; marrow fat	YMF; MF	fraction; %	2015	3	[43; 50; 559]
		MAT fraction	MAT fraction	fraction	2015	1	[44]
		fractional volume of yellow marrow	YM	fraction	2019	1	[256]
	Adipose volume (per marrow volume)	adipose volume to total marrow volume	AV/TV	%	2019	1	[118]
		marrow adiposity index	MAI	%	2019	1	[118]
		BMAT	Ad.V/Ma.V	%	2019	1	[257]
	BM density	CT density	*none*	K**	1986	1	[496]
		Fat density; marrow fat density; CT marrow density	Marrow FD; MaD	g/cm^3, mg/cm^3	2008	4	[4; 5; 11; 34]
		Bone marrow density	*none*	mg/cm^3	2019	1	[105]
	adipose volume (per tissue volume)	marrow adiposity; marrow adipose tissue % (MAT %)	FV/BV, FV/TV, MAT	%	2011	2	[13; 89]
µCT *(samples stained with osmium tetroxide or other contrast agents)*	**adipose volume** (per marrow volume)	adipocyte volume/marrow volume	*none*, Ad.V/Ma.V	%	2014	4	[91; 136; 182; 257]
		marrow adipose tissue/marrow volume; marrow fat/marrow volume	*none*, MAT/marrow	%	2014	4	[39; 76; 234; 318]
		metaphyseal adipose area	*none*	% medullar area	2012	*1*	[22]
		marrow adipose tissue (MAT)	MAT, MV	%MV	2014	1	[385]
		fat volume/total volume	FV/TV	fraction	2017	1	[242]
	adipose volume (per tissue or total volume)	adipocyte volume/total volume	AV/TV	fraction	2014	2	[38; 400]
		MAT volume/total volume; marrow	*none*, MAT/TV	%	2015	3	[145; 472; 487]
		adipose/tissue volume; vol. adipose	*none*	%	2017	2	[77; 102]
		MAT volume/femoral volume	MAT	%	2017	1	[406]
		MAT volume/tissue volume	MAT/TV	%	2016	1	[405]

		percentage of adipocyte volume in the total volume	Ad.V/TV	%	2018	1	[91]
		% osmium in mm^3/total bone volume	*none*	%	2014	1	[471]
		osmium volume/marrow cavity volume	OV/TV	*n.s.*	2016	1	[68]
	adipose volume (unclear if per tissue volume or per marrow volume)	bone marrow fat	*none*	*n.s.*	2017	1	[152]
		marrow fat fraction	*none*	fraction	2016	1	[404]
		marrow adipose tissue (MAT)	MAT	% osmium	2015	1	[473]
		percent adiposity	*none*	%	2017	1	[85]
	adipose volume (absolute)	MAT volume	MAT, MAT vol.	mm^3	2015	4	[76; 234; 370; 412]
		distal MAT volume; proximal MAT	*none*, dTib	mm^3	2016	3	[93; 405; 412]
		osmium volume	*none*	mm^3	2016	2	[68; 327]
		tibia BMAT volume; proximal tibia	*BMAT*	mm^3	2018	1	[172]
		marrow fat volume; distal fat volume; proximal fat volume	*FV, dFV, pFV*	mm^3	2017	1	[242]
	adipocyte density (per marrow volume)	adipocyte number; adipocyte density	Ad.N	mm^{-3}	2014	2	[136; 560]
	adipocyte area (distribution of individual adipocyte areas)	adipocyte area	*none*	μm^2	2015	1	[368]

Supplementary Table 8 (related to Table 9): Full list of all terms, abbreviations and units that have been used to report CT-based measurements of bone marrow adiposity. Terms are grouped by imaging method and the type of measurement reported. Data are presented as described for Supplementary Table 6. Most studies assess adipose volume normalized to marrow volume or total tissue volume, although in some cases it is unclear which of these is used for normalisation. In some cases, no abbreviation is used (*none*) and/or units are not stated (*n.s.*). **K = density relative to K_2HPO_4 phantom.

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